

1 **ABSTRACT**

2 Context-aware computing systems and methods are described. In particular  
3 embodiments, location aware systems and methods are described. In the described  
4 embodiments, hierarchical tree structures are utilized to ascertain a device context  
5 or location. The tree structures can be stored on or accessible to mobile  
6 computing devices so that the devices can determine their own particular context  
7 or location. In one embodiment, one of the tree structures comprises a Master  
8 World tree structure that contains nodes that represent geographical divisions of  
9 the Earth. Another of the tree structures can comprise a so-called Secondary  
10 World that contains nodes that represent physical or logical entities that are  
11 organization or company specific views of the world. A computing device can  
12 automatically determine its context or location by ascertaining a node on one or  
13 more of the tree structures and then traversing the tree structure to ascertain the  
14 complete context. A unique device architecture is described that permits context  
15 aware computing. The device architecture comprises a context service module, a  
16 common interface, and one or more context providers. The context providers  
17 provide information, through the common interface, that pertains to the context of  
18 a device, and the context service module processes the information to device the  
19 device's context. An application program interface (API)/events layer is provided  
20 through which various applications can call the device to ascertain the device's  
21 location so that location dependent goods or services can be rendered. A privacy  
22 manager is also provided in some embodiments to enforce privacy thereby  
23 protecting the granularity of the location information that is provided to the  
24 applications. In addition, unique location beacons are described that transmit  
25 information that can be used by the computing device to ascertain its location.